REMARKS

Reconsideration and allowance of the above-identified application are respectfully requested.

Claims 1-58 are currently pending in the application. This response amends Claims 1, 29 and 33-34 to more particularly point out Applicant's invention.

Rejection Under 35 U.S.C. § 112

Claim 28 stands rejected under Section 112 as failing to comply with the written description requirement because Applicant's specification purportedly does not teach the claimed "set-top box". Applicant respectfully traverses this rejection and submits that the "set-top box" is adequately described in related application no. 09/602,960 at page 12, lines 20-25, which is fully incorporated by reference (see Applicant's specification page 1, lines 7-21). Thus, claim 28 satisfies the statutory written description requirement.

Rejection Under 35 U.S.C. § 103

Claims 1-8, 12-18, 21, 23, 25-30, 32-41, 45-51, 35-53, and 56-58 stand rejected under Section 103 as being obvious in view of the combination of U.S. Patent No. 6,493,409 (Lin) and U.S. Patent No. 6,101,626 (Morelos-Zaragoza); claims 9-11 and 42-44 stand rejected under Section 103 as being obvious in view of the combination of Lin, Morelos-Zaragoza, and U.S. Patent No. 4,466,108 (Rhodes); claims 19-20, 24 and 55 stand rejected under Section 103 as being obvious in view of the combination of Lin, Morelos-Zaragoza, and U.S. Patent No. 5,691,974 (Zehavi); and claims 22, 31 and 52 stand rejected under Section 103 as being obvious in view of the combination of Lin, Morelos-Zaragoza, and U.S. Patent No. 5,933,462 (Viterbi).

Applicant respectfully traverses each of these rejections because the proposed combinations of references fail to teach or suggest all of the features recited in independent claims 1,29, 33 and 34. As the Examiner is aware, for a claim to be obvious, there must be 1) a suggestion or motivation to combine reference teachings, 2) a reasonable expectation of success, and 3) the references must teach or suggest all of the claim limitations. See MPEP § 2143; *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). It is well established at law that, for

a proper rejection of a claim under 35 U.S.C. §103 as being obvious based upon a combination of references, the cited combination of references must disclose, teach, or suggest, either implicitly or explicitly, *all elements/features/steps of the claim* at issue. See, *e.g., In re Dow Chemical*, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988), and *In re Keller*, 208 U.S.P.Q.2d 871, 881 (C.C.P.A. 1981) (emphasis added).

The cited references, either alone or in combination, do not teach or suggest the claimed carrier phase tracking systems and method that operate on "a multi-dimensional symbol having a vector of complex-valued symbols". Specifically, claim 1 recites:

> "A system comprising:
> a symbol estimation module for determining, for *a multi-dimensional symbol* r_k^D *having a vector of complex-valued symbols* ... an estimate of the multi-dimensional symbol; and
> a residual determination module ... for determining a residual or a function thereof for the multi-dimensional symbol . . . ." (emphasis added)

The other independent claims 29, 33, and 34 recite similar subject matter.

In no instance does the combination of Lin and Morelos-Zaragoza teach or suggest the above-quoted features. In paragraph 4 of the Office Action, the Examiner acknowledged that Lin does not teach or suggest the above-quoted features. Furthermore, Morelos-Zaragoza entirely fails to teach or suggest these features. The claimed multi-dimensional symbol includes a vector of complex-valued symbols. Therefore, a two-dimensional code would generate 1-dimensional [complex] symbols, and a 4-dimensional code would generate 2-dimensional [complex] symbols.

In sharp contrast, Morelos-Zaragoza's Figure 2 encoder is not a multi-dimensional encoder, much less an encoder that operates on a multi-dimensional symbol having a vector of complex-valued symbols. The encoder of Figure 2 takes three input bits and generates four output bits. These bits are not symbols in the modulation symbol sense. Instead, they are algebraic symbols that normally are called bits, since most convolutional codes, including those disclosed in Morelos-Zaragoza, are constructed using binary Galois field arithmetic.

To further point out this distinction, after encoding in the Morelos-Zaragoza system, the output bits are then mapped to a "modulation symbol", which is not a multi-dimensional code. If the Morelos-Zaragoza encoder maps its output to a 16-QAM symbol (which maps 4 bits at a time to a symbol), then this encoder is not using a multi-dimensional (M>2) code. Even if the bits are

mapped to QPSK, which would require two symbols for four bits, the code is not multi-dimensional either, because three trellis sections (i.e., three clocks of the base rate ½ encoder) would be required to generate the resulting two QPSK symbols. Thus, if Morelos-Zaragoza was using a multi-dimensional code, one trellis section (i.e., one clock) of the base code would generate so many output bits that multiple modulation symbols would be required to accommodate all of the output bits. In no way is this taught or suggested by Morelos-Zaragoza.

For at least the foregoing reasons, claims 1, 29, 33 and 34, as well as all other pending claims by their respective dependency, are patentable over the combination of Lin and Morelos-Zaragoza under Section 103.

Conclusion

In view of all of the above, it is respectfully submitted that all claims are allowable. The Examiner is therefore requested to allow all claims and pass this application to issuance.

Applicant believes no fees are due for filing this Response. If any additional fees associated with this Response are in fact due, the Commissioner is hereby authorized to charge Howrey Deposit Account No. 08-3038 for the same referencing Howrey Dkt. No. 01827.0044.00US00.

Respectfully submitted,

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